



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,944	10/31/2003	Naoya Sashida	021557A	8925
23850 7590 12/04/2007 KRATZ, QUINTOS & HANSON, LLP 1420 K Street, N.W. Suite 400 WASHINGTON, DC 20005			EXAMINER DICKEY, THOMAS L	
			ART UNIT 2826	PAPER NUMBER
			MAIL DATE 12/04/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/697,944

**Applicant(s)**

SASHIDA, NAOYA

**Examiner**

Thomas L. Dickey

**Art Unit**

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 21-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 10/315,929.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

Art Unit: 2826

## DETAILED ACTION

1. The amendment filed on 10/18/2007 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by CUCHIARO ET AL. (6,225,656).

With regard to claim 21 Cuchiaro et al. discloses a semiconductor device comprising a first insulating film 116 formed over a semiconductor substrate 102; a capacitor 120 constructed by forming a lower electrode 122, a dielectric film 124, and an upper electrode 126 sequentially over the first insulating film 116; a first capacitor protection insulating film 137 covering the upper side of the upper electrode 126 and the aspect of the upper electrode 126 and the dielectric film 124; a second capacitor protection insulating film 138 formed over the first capacitor protection insulating film 137; and a

Art Unit: 2826

second insulating film 139 formed in its entirety on the second capacitor protection insulating film 138. Note figure 3 and column 7 lines 20-65 of Cuchiaro et al.

With regard to claims 22 and 23 Cuchiaro et al. discloses a semiconductor device comprising a first insulating film 116 formed over a semiconductor substrate 102; a capacitor 120 constructed by forming a lower electrode 122, a dielectric film 124, and an upper electrode 126 sequentially over the first insulating film 116; a first capacitor protection insulating film 138 covering the dielectric film 124 and the upper electrode 126; a second capacitor protection insulating film 139 formed over the first capacitor protection insulating film 138; a second insulating film 136 formed over the second capacitor protection insulating film 139; and a first-layer metal wiring 160 formed over the second insulating film 136 and connected electrically to the upper electrode 126 via a contact hole 148 extending through the second insulating film 136, the second capacitor protection insulating film 139 and the first capacitor protection insulating film 138. Note figure 3 and column 7 lines 20-65 of Cuchiaro et al.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2826

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over CUCHIARO ET AL. (6,225,656) in view of FURUMURA ET AL. (5,506,443).

Cuchiaro et al. discloses a semiconductor device comprising a first insulating film 116 formed over a semiconductor substrate 102; a capacitor 120 constructed by forming a lower electrode 122, a PZT (note column 9 line 15) dielectric film 124, and an upper electrode 126 sequentially over the first insulating film 116; a silicon nitride (note column 3 line 40) first capacitor protection insulating film 138 covering the dielectric film 124 and the upper electrode 126; a second capacitor protection insulating film 139 formed over the first capacitor protection insulating film 138; a silicon oxide (note column 6 line 3) second insulating film 136 formed over the second capacitor protection insulating film 139; and a first-layer metal wiring 160 formed over the second insulating film 136 and connected electrically to the upper electrode 126 via a contact hole 148 extending through the second insulating film 136, the second capacitor protection insulating film 139 and the first capacitor protection insulating film 138. Note figure 3 and column 7 lines 20-65 of Cuchiaro et al.

Art Unit: 2826

Cuchiaro et al. does not disclose that an amount of carbon contained in the second capacitor protection insulating film is larger than an amount of carbon contained in the second insulating film.

However, Furumura et al. discloses a semiconductor device wherein an SiO<sub>2</sub> layer (such as Cuchiaro et al.'s SiO<sub>2</sub> second insulating layer 136) is strongly affixed to an underlying SiN layer (such as Cuchiaro et al.'s SiN films 138-139) by virtue of the upper portion (such as Cuchiaro et al.'s SiN second capacitor protection insulating film 139) of the SiN layer being infused with a carbon concentration 100-1000 times higher than the carbon concentration of the overlying SiO<sub>2</sub> layer (equivalent to Cuchiaro et al.'s second insulating layer 136). Note claims 1-4, as well as figure 2, of Furumura et al. Furumura et al. explain, note column 4 lines 55-67 and the table topping column 5, that it has been experimentally verified that a high carbon-content SiN layer at an SiN/SiO<sub>2</sub> interface prevents "peel-off" of the overlying SiO<sub>2</sub> layer. it would therefore have been obvious to a person having skill in the art to raise the carbon levels of the SiN second capacitor protection insulating film 139 at the SiN/SiO<sub>2</sub> interface of Cuchiaro et al.'s semiconductor device, such as is taught by Furumura et al., in order to increase adherence between this layer and the overlying SiO<sub>2</sub> second insulating film 136 to thus prevent "peel-off" and subsequent failure of the device.

Art Unit: 2826

***Response to Arguments***

5. Applicant's arguments with respect to claims 1-5 and 21-23 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

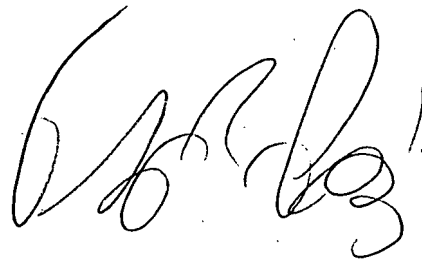
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 2826

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L. Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, please contact the examiner's supervisor, Sue A. Purvis, at 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'T. L. Dickey', is positioned above the printed name.

**/Thomas L. Dickey/  
Primary Examiner  
Art Unit 2826**